# A revision of the foraminiferal genus *Adercotryma* Loeblich & Tappan, with a description of *A. wrighti* sp. nov. from British waters

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*Adercotryma* Loeblich & Tappan (1952) was erected to accommodate *Lituola glomerata* Brady (1878), a species assigned subsequently to *Haplophragmium, Haplophragmoides* and *Trochammina* by various authors. A recent examination of the type material in the British Museum (Natural History), and of specimens from other collections deposited there and in the National Museum of Ireland, led to the discovery that the original definition was inadequate and to the recognition of a second species. The purpose of this paper is to emend the diagnosis of *Adercotryma,* to redescribe *A. glomeratum* (Brady), and to describe the new species.

The generic diagnosis below is based on the redescription of the type species, and differs from the original definition in that it recognises the significance of the asymmetrically placed aperture and shows the coiling to be trochospiral. *Adercotryma* is therefore transferred from the Lituolacea to the Trochamminacea and placed in a new subfamily of the Trochamminidae. The definition follows the format adopted by Brönnimann *et al.* (1983) in their reclassification of the Trochamminacea.

Superfamily **TROCHAMMINACEA** Schwager, 1877
Family **TROCHAMMINIDAE** Schwager, 1877
Subfamily **ADERCOTRYMINAE** nov.

DEFINITION. Test free; adult, a completely or almost completely involute, cone-like, trochospire; wall agglutinated, imperforate, single-layered, aperture interiomarginal, single; without secondary septa or infoldings of the umbilical chamber walls or incomplete secondary partitions.

TYPE GENUS. *Adercotryma* Loeblich & Tappan, 1952.

REMARKS. The Adercotryminae differs from all other subfamilies in that its members are completely or almost completely involute on the spiral side. Brönnimann *et al.* (1983: 204) distinguished the Trochamminacea from the Ataxophragmiacea on the ratio of spire height to umbilical diameter: the former being always smaller than the latter in the Trochamminacea. At first sight, the high cone-shaped test of *Adercotryma* does not fulfil this criterion, but since the coiling is involute and the proloculus is situated within the shell (see Figs 3, 6), the spire height measured from the proloculus is invariably less than the umbilical diameter.

Genus ***ADERCOTRYMA*** Loeblich & Tappan, 1952

TYPE SPECIES. *Lituola glomerata* Brady, 1878. Recent, marine; distribution apparently worldwide. Lectotype from Arctic waters.

EMENDED DEFINITION. Test free; coiling trochospiral, adult an inverted cone, completely or almost completely involute on both sides. Chambers axially elongate. Aperture single, interiomarginal, umbilical, symmetrical with respect to long axis of chamber. Wall agglutinated, single layered, imperforate.


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REMARKS. The slit-like aperture rests with its border on the first and on the penultimate chamber of the final whorl (*Paratrochammina*-type aperture). *Adercotryma* differs from *Paratrochammina* Brönnimann, 1979 (type species: *P. madierae* Brönnimann, 1979) and all other genera of the Trochamminininae by its spirally involute enrolment, axially elongate chambers, symmetrical interiomarginal aperture (with respect to the long axis of the chamber), and inverted cone-like test.

***Adercotryma glomeratum*** (Brady)
Figs 1, 2A–F, 3A, 4A–E, 5A–J, 6A–F

1878 *Lituola glomerata* Brady: 433, pl. 20, figs 1a–c.
1884 *Haplophragmium glomeratum* (Brady); Brady: 309, pl. 34, figs 15–18.
1910 *Haplophragmoides glomeratum* (Brady) (*sic*); Cushman: 104, figs 158–161 (after Brady, 1884).
1931 *Trochammina glomerata* (Brady); Wiesner: 112, pl. 17, figs 204, 205.
1952 *Adercotryma glomerata* (Brady) (*sic*); Loeblich & Tappan: 141, figs 1–4.
1961 *Adercotryma glomerata glomerata* (Brady); Saidova: 35, pl. 10, fig. 54.
1961 *Adercotryma glomerata abyssorum* Saidova (*sic*): 36, pl. 10, fig. 55.
1975 *Adercotryma glomerata antarctica* Saidova (*sic*): 75, pl. 96, fig. 6.

MATERIAL. Extant material in the Brady Collection of the British North Polar Expedition (1875–1876), labelled *Lituola glomerata,* is as follows: Station A, off Tyndall Glacier, 27 fms (49 m); F, between Walrus Shoal and Victoria Head, 57 fms (104 m); H, Franklin Pierce Bay, 13–15 fms (24–28 m); I, Allman Bay, 25 fms (46 m); J, Dobbin Bay, 45–47 fms (82–86 m); K, Dobbin Bay, 113 fms (207 m); N, off Hayes Point, 35 fms (64 m); O, off Cape Frazer, 50 fms (92 m) and P, off Cape Frazer, 80 fms (146 m). These localities are from the northern part of Baffin Bay and Smith Sound (between Ellesmere Island, NE Canada, and W Greenland). All the slides contain a few specimens at least, and some (e.g. station G) as many as 50.

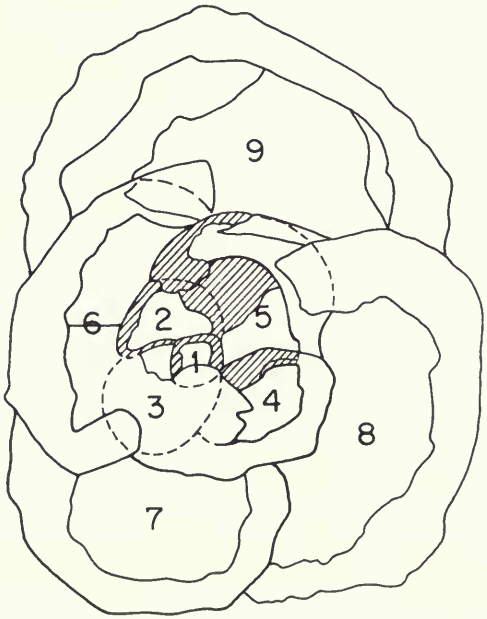



**Fig. 1.** *Adercotryma glomeratum* (Brady). Paralectotype, 1955.10.28.1732. Interpretative drawing of specimen in Figs 6A–C, taken at the third level of dissection (see explanation of Fig. 6C), showing chambers 1 to 9. Hatched areas represent exposed walls of earliest chambers. × 300.

From Franklin Pierce Bay, lat. 79°28'N, station H, depth 46 fathoms (84 m). British North Polar Expedition of 1875–1876, ex BMNH slide no. 1955.10.28.1731–1780, labelled *'Lituola glomerata* Brady'.

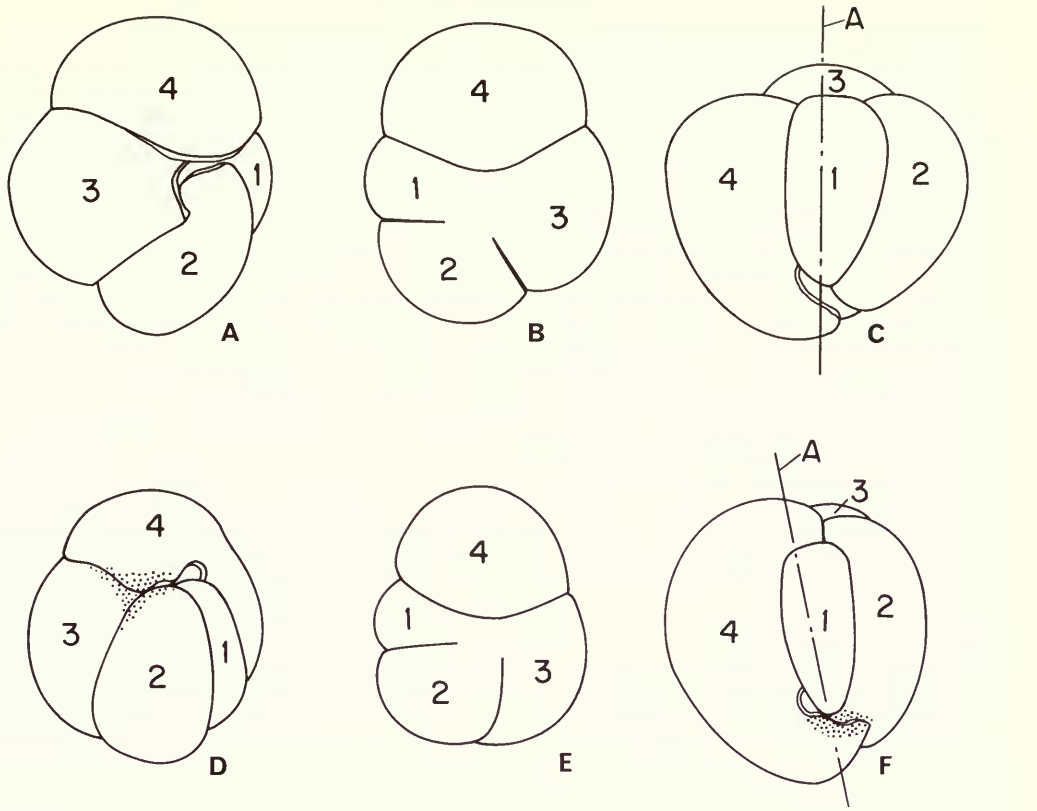



**Fig. 2A–F.** *Adercotryma glomeratum* (Brady). 2A–C, Paralectotype, 1955.10.28.1701. Interpretative drawing of specimen in Figs 5E–G, J. 2A, umbilical view showing the overlapping chamber walls and the preserved apertural slits of the last three chambers; 2B, spiral view; 2C, edge view showing aperture of final chamber, with axis of coiling marked by line A. 2D–F, Paralectotype, 1955.10.28.1700. Interpretative drawing of specimen in Figs 5A–D. 2D, umbilical view showing aperture of final chamber in part masked by agglutinated or secreted material; 2E, spiral view; 2F, edge view of inverted cone-like test with aperture of final chamber in part masked, axis of coiling is indicated by line A. Both × 150.

Both from slide labelled *'Lituola glomerata* Brady'. British North Polar Expedition of 1875–1876. Cape Frazer, lat. 79°45'N, station O, depth 50 fathoms (92 m), ex BMNH slide no. 1955.10.28.1700–1731.

LECTOTYPE. 1955.10.28.1781 (Figs 4A–E). From Brady's syntypic series, obtained from Station P, off Cape Frazer, Arctic Canada, depth 80 fathoms (146 m). Believed to be the specimen figured by Brady (1878, pl. 20, fig. 1b).

DESCRIPTION (LECTOTYPE). Test free; a dextral, tightly coiled trochospire, with 4 chambers in the final whorl, each gradually increasing in size; involute on spiral side. Test a short, broad, inverted cone-like structure, flatly truncated spirally, rounded-convex umbilically, broadly rounded peripherally and somewhat rounded laterally. In edge view, 3 chambers seen on both sides. In spiral/umbilical view, oval-lobate; umbilical side with a small, well-defined subcircular and shallow axial depression. Adult chambers much elongated in axial (edge) view, narrow radially and somewhat elongate tangentially, more inflated towards the spiral, than towards the umbilical side. Intercameral sutures straight but indistinct spirally; straight, distinct, laterally and umbilically. Aperture single, interiomarginal, a narrow elongate slit with rounded extremities, at umbilical end of chamber; symmetrical with respect to its long axis. Border of aperture rests on the first and

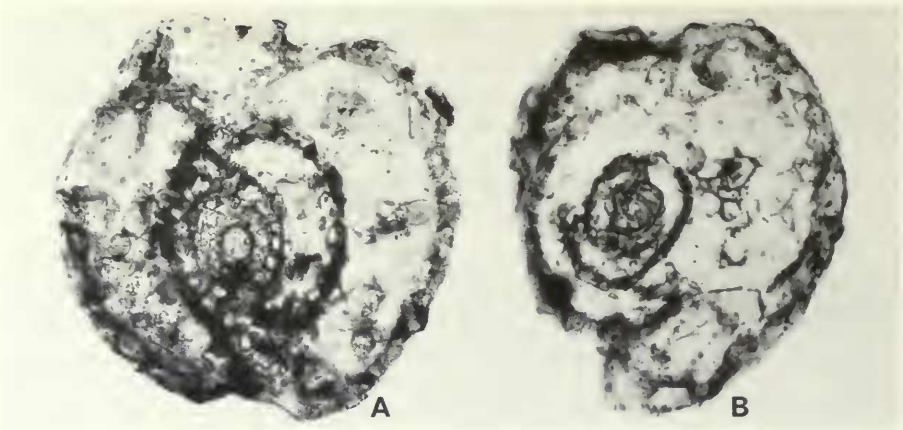



**Fig. 3A** *Adercotryma glomeratum* (Brady). Paralectotype, 1955.10.28.1782. Section cut parallel to axis of coiling. Note the thin-walled proloculus already slightly elongate in the direction of the coiling axis. × 205.

From Cape Frazer, lat. 79°45′N, station P, depth 80 fathoms (146 m). British North Polar Expedition of 1875–1876, ex BMNH slide no. 1955.10.28.1781–1799, labelled '*Lituola glomerata* Brady'.

**Fig. 3B.** *Adercotryma wrighti* Brönnimann & Whittaker sp.nov. ZF 4453. Section cut slightly obliquely to axis of coiling. × 250.

From south of Mull, W Scotland, depth 20 fathoms (37 m). S.Y. *Runa* station 2, collected 1913. Heron-Allen & Earland Collection (BMNH), slide labelled '*Haplophragmium glomeratum* (Brady)'.

penultimate chambers of final whorl (*Paratrochammina*-type). Final chamber covers about half of the preceding apertural slit. Wall agglutinated, imperforate, coarser on truncated, spiral side than on rounded-comvex, umbilical side. Colour, prior to coating for SEM photography, yellowish-brown.

Dimensions (lectotype). Maximum spiral/umbilical diameter 320 μm, minimum diameter 270 μm, height 260 μm. Height of apertural slit c. 12 μm.

Paralectotypes: 3 sinistral specimens (1955.10.28.1700–1702) are figured in Figs 2A–F, 5A–J; another 3 (1955.10.28.1732, 1955.10.28.1783 and 1955.10.28.1703), dissected out to show various aspects of the internal coiling, are figured in Figs 1, 6A–F, whilst a further paralectotype (1955.10.28.1782) has been sectioned and is illustrated in Fig. 3A. These specimens, as with others remaining in Brady's syntypic series, vary considerably in their dimensions, elongation of the chambers in the final whorl, depression of the sutures, depth of the umbilicus and spiral aspect. For further comments, see the figure explanations and Remarks section below. The maximum spiral/umbilical diameter of the figured paralectotypes varies from 230 to 290 μm, the test height, from 250 to 270 μm.

Remarks. Brady's small and enigmatic species was placed by authors in *Lituola, Haplophragmium, Haplophragmoides* and *Trochammina* prior to the erection of *Adercotryma* by Loeblich & Tappan (1952). The generic changes stem mainly from differing interpretations of the mode of coiling of the curious cone-shaped test.

Although Brady (1878) originally referred to the test as merely '. . . spiral in arrangement', his subsequent comparison (Brady, 1884) of the overall shape with that of a '. . . nautiloid species, such as *Haplophragmium latidorsatum,* drawn out as the umbilici so as to form a test bearing some resemblance to the oval Alveolinae', implied that the coiling was planispiral. He clearly was not sure, however, as he made much in these two papers of the unusual 'unsymmetrical convolutions'.

It was Cushman (1910) who first described the coiling, without reservation, as planispiral, placing Brady's species in his new genus *Haplophragmoides,* an assignment which was generally

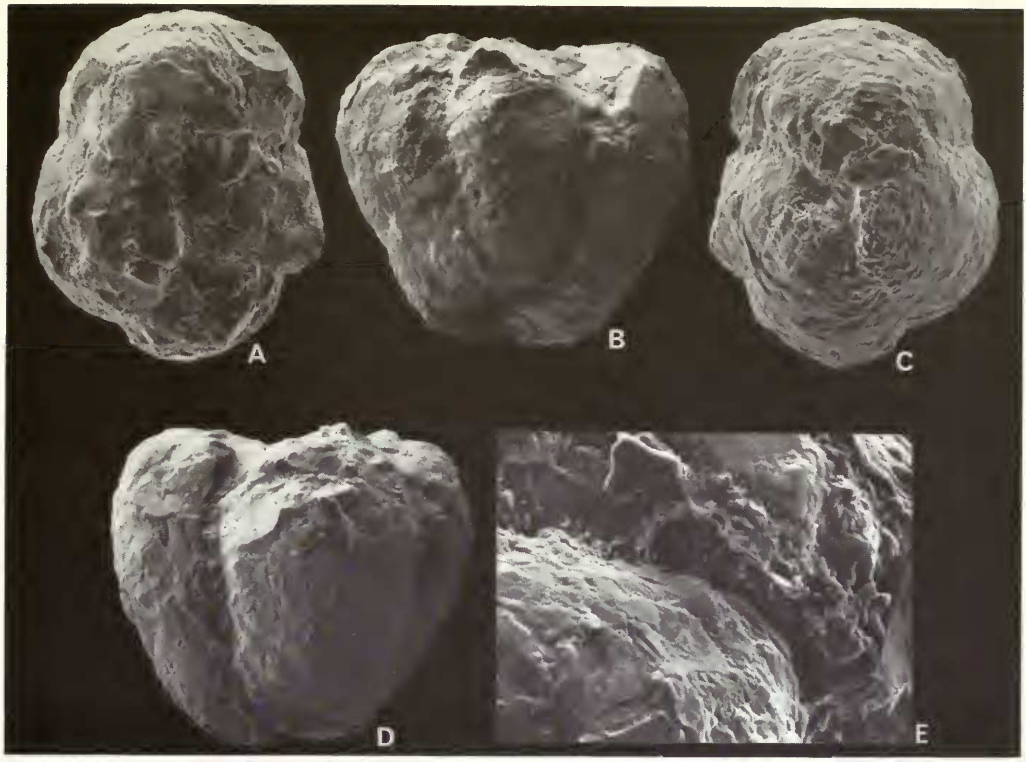


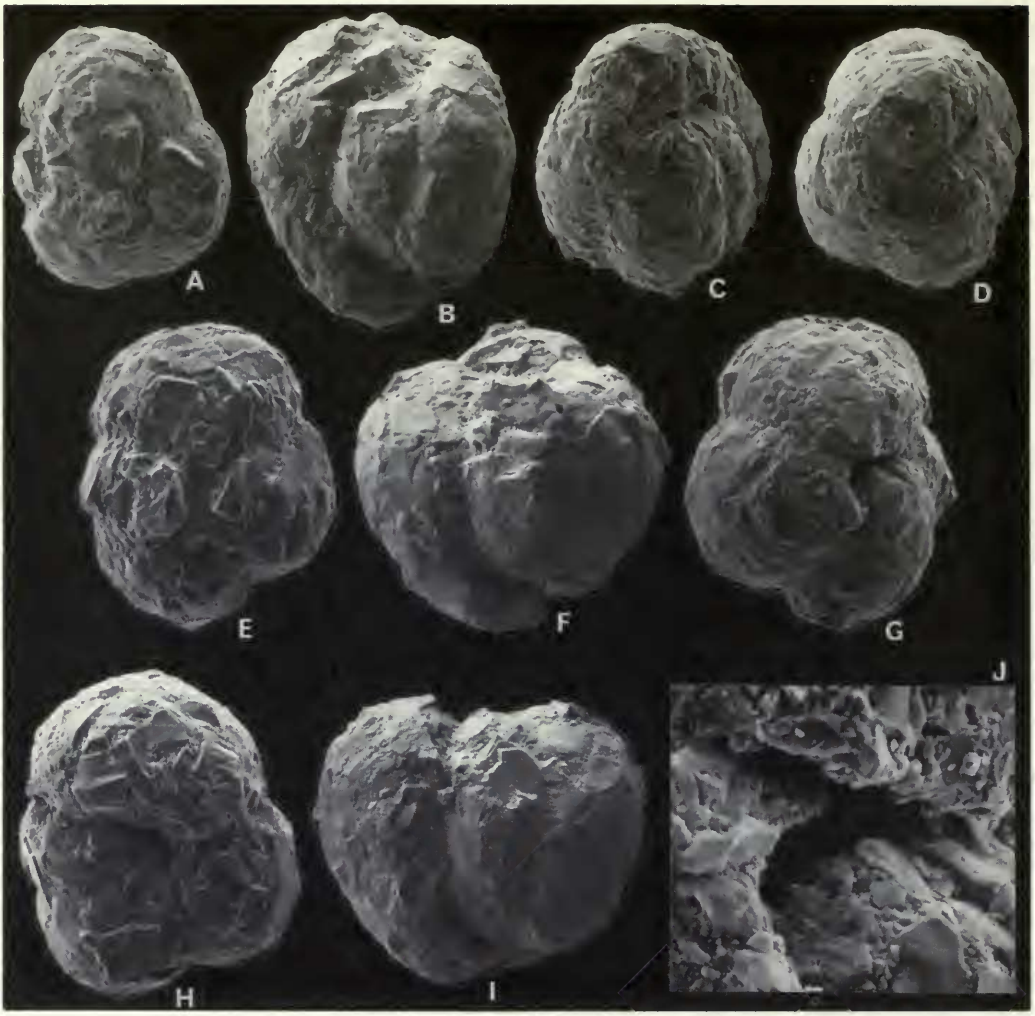

**Fig. 4A–E.** *Adercotryma glomeratum* (Brady). Lectotype, 1955.10.28.1781. 4A–D, spiral, edge (apertural), umbilical and edge (antapertural) views, × 150. 4E, detail of lateral, open part of aperture, × 525.

From slide labelled '*Lituola glomeratum* Brady'. British North Polar Expedition of 1875–1876. Cape Frazer, lat. 79°45'N, station P, depth 80 fathoms (146 m), ex BMNH slide no. 1955.10.28.1781–1799.

followed for over forty years. The only exception was Wiesner (1931) who placed *glomerata* in *Trochammina,* although he did not make a detailed examination of its morphology and his paper offers no evidence for trochospiral coiling. A year earlier, however, Lacroix (1930) had considered the position of the aperture, ignored completely by Cushman, to be more in keeping with a trochospiral genus. In terms of coiling, Lacroix considered Brady's species transitional between the planispiral *Haplophragmoides* and the trochospiral *Trochammina,* but nevertheless retained it in the former genus.

In 1952, Loeblich & Tappan erected a new lituolid genus *Adercotryma,* with *Lituola glomerata* Brady as type. The name refers to the apertural features, derived from two Greek words *aderco-* unseen, invisible, and *tryma-* meaning a hole or aperture. The gender of the name *Adercotryma* is neuter, and the specific name should be construed as *glomeratum,* not *glomerata* as originally written. Loeblich & Tappan (1952) distinguished their new genus from *Haplophragmoides* on the somewhat asymmetrical, completely involute, rather than slightly evolute test which has its greatest dimension in the axis of coiling, and by its aperture which lies near the umbilicus of one side, rather than in the plane of coiling at the periphery. Of these features, only two are fundamentally different from those of *Haplophragmoides*: the asymmetrical test morphology and the asymmetrical interiomarginal apertural position. In no part of their original paper, nor in 1964, did Loeblich & Tappan discuss the curious asymmetry of what they obviously assumed to be a planispiral test. *Adercotryma* was placed in the Haplophragmoidinae Maync, 1952 (Lituolidae de Blainville, 1825), in which were included both planispiral and streptospiral forms.

Even though the test of *A. glomeratum* is involute, the external and internal morphology clearly




**Figs 5A–J.** *Adercotryma glomeratum* (Brady). 5A–D, Paralectotype, 1955.10.28.1700. Spiral edge, oblique-umbilical and umbilical views, × 150. 5E–G, J, Paralectotype, 1955.10.28.1701, E–G, spiral, edge and umbilical views, × 150; 5J, detail of interiomarginal apertures of final and penultimate chambers, in umbilical view, × 475. 5H, I, Paralectotype, 1955.10.28.1702. Spiral and edge views, × 150.

All specimens from slide labelled '*Lituola glomerata* Brady'. British North Polar Expedition of 1875–1876. Cape Frazer, lat. 79°45'N, station O, depth 50 fathoms (92 m), ex BMNH slide no. 1955.10.28.1700–1731.

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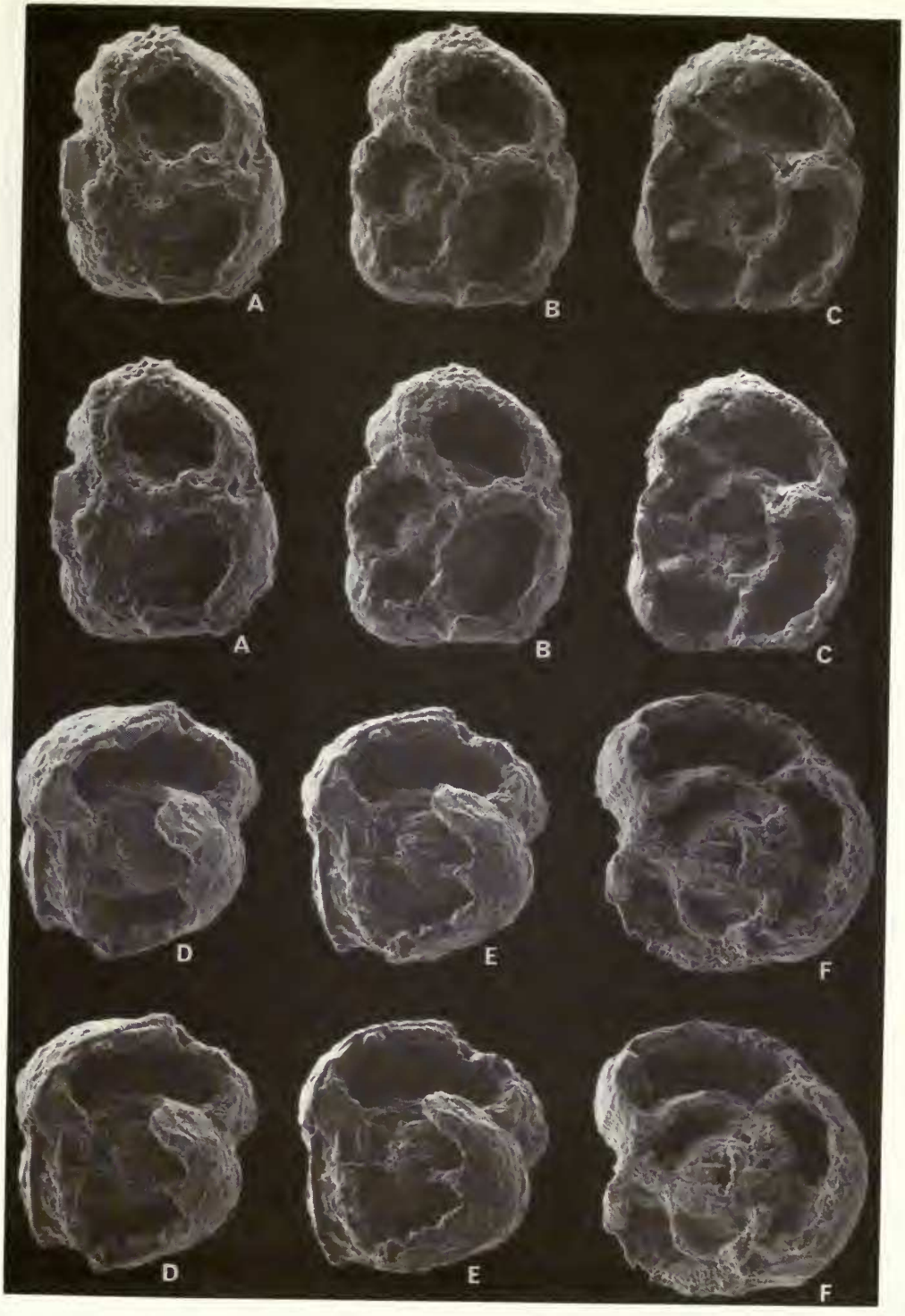
**Figs 6A–F.** *Adercotryma glomeratum* (Brady). 6A–C, Paralectotype, 1955.10.28.1732. Stereo-pairs of three stages of dissection, perpendicular to axis of coiling; the involute spiral side has been removed. The third stage of dissection (6C) has broken open the earliest whorl and proloculus (see Fig. 1, for interpretative drawing). 6D, E, Paralectotype, 1955.10.28.1783. Stereo-pairs of dissected specimen shown at two different tilts. Dissection is in plane virtually parallel to coiling axis. 6F, Paralectotype, 1955.10.28.1703. Stereo-pair of specimen dissected perpendicular to axis of coiling. All × 150.

Figs 6A–C from Franklin Pierce Bay, lat. 79°28'N, station H, depth 46 fathoms (84 m), ex BMNH slide no. 1955.10.28.1731–1780. Figs 6D, E from Cape Frazer, lat. 79°45'N, station P, depth 80 fathoms (146 m), ex BMNH slide no. 1955.10.28.1781–1799. Fig. 5F, same locality, station O, depth 50 fathoms (92 m), ex BMNH slide no. 1955.10.28.1700–1731. British North Polar Expedition of 1875–1876.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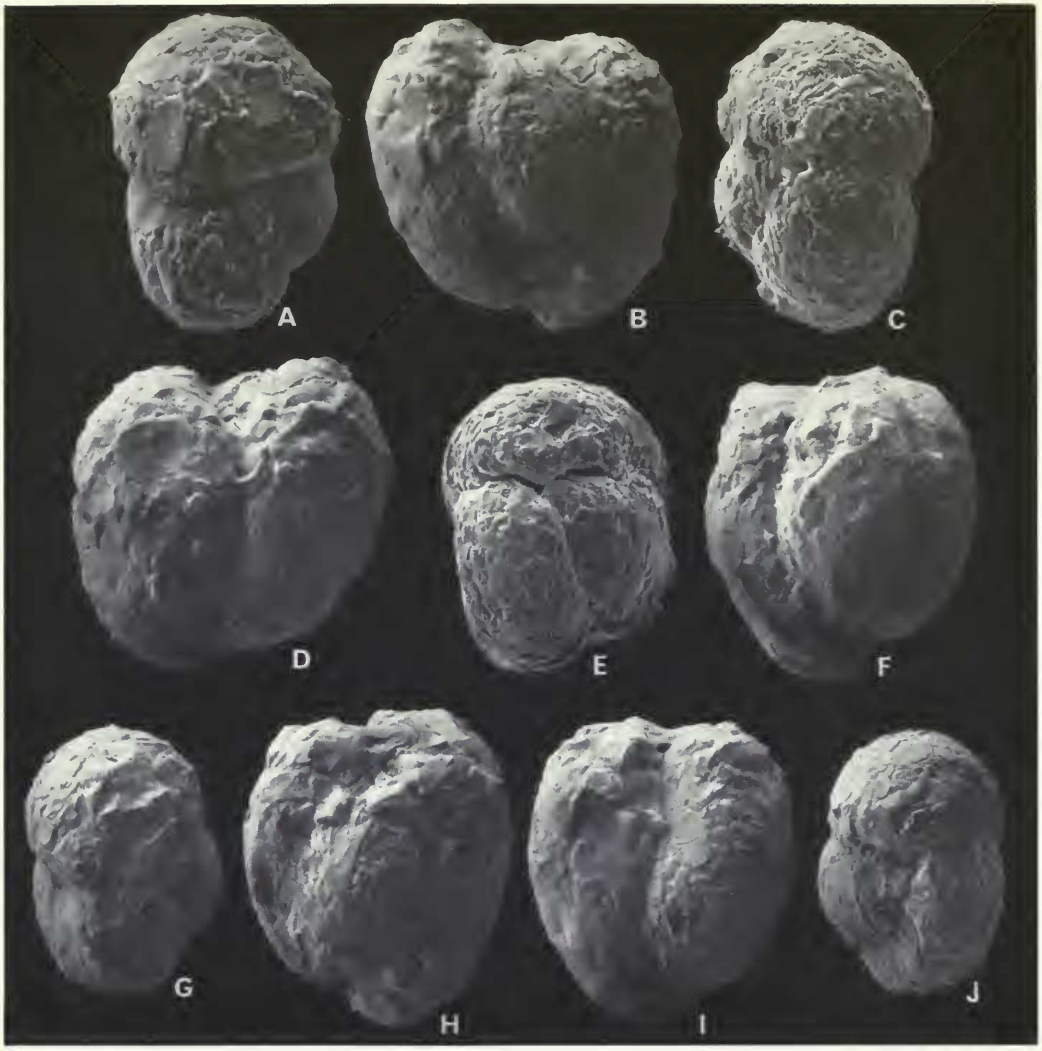


**Figs. 7A–J.** *Adercotryma wrighti* Brönnimann & Whittaker sp.nov. 7A–D, Holotype, NMI no. 149.1985. Spiral, edge (apertural), umbilical and edge (antapertural) views. 7E, F, Paratype, NMI no. 4.1980. Oblique-umbilical and edge views. 7G–J, Paratype, NMI no. 5.1980. Spiral, edge (apertural), edge (antapertural) and umbilical views. All × 175.

All from off Drogheda, E Ireland, depth 16 fathoms (29 m); ex slide no. 34, labelled 'Dublin: off Drogheda, 16 fms & Lambay Deep, 70 fms (mixed)', J. Wright Collection, 13–1921, National Museum of Ireland.

indicates a trochospiral mode of coiling (Figs 1–6). As well as the asymmetrical aperture, the adult test, when orientated with the axis of coiling in vertical position, shows a truncated, more or less flattened aboral or spiral side, and an obtusely pointed, ovoid-rounded oral or umbilical side. This differentiation is typical of trochospiral tests.

Saidova (1961; 1975) introduced two new subspecies of *A. glomeratum,* namely *A. g. abyssorum* and *A. g. antarctica,* respectively. They are figured together with a typical *A. g. glomeratum* also in Saidova (1975, pl. 96, figs 4–6). The difference in shell morphology said to characterise the two (test size, chamber shape and elongation) falls within the range of variation seen in our paralectotypes (compare our Figs 5B and 5I with Saidova's pl. 96, figs 6 and 5, respectively), whilst the type of

agglutinant, also used by Saidova (1961) as a distinguishing feature of *A. g. abyssorum,* is not considered by us to have any taxonomic validity.

*A. glomeratum* (Brady) differs from *A. wrighti* sp. nov. in having a broadly inverted cone-like test with 4 axially elongate chambers in the final whorl, in the shape of the adult chambers, and in the apertural features. See also pp 27, 28 for further remarks on their differences. In the material studied, *A. glomeratum* always has 4 chambers in the final whorl, even the preceding whorl (Figs 1, 6C) has 4 chambers. This results in 3 chambers being visible on either side of the test when seen in edge view (aperturally and antaperturally).

*A. glomeratum* is a very wide-ranging species both in terms of latitudinal and depth distribution as noted by Saidova (1975) and Culver & Buzas (1985).

### *Adercotryma wrighti* Brönnimann & Whittaker sp. nov.
Figs 3B, 7A–J

1908 *Haplophragmium glomeratum* (Brady); Millett: 5 (list), pl. 1, fig. 6 (*non Lituola glomerata* Brady, 1878).
1913 *Haplophragmium glomeratum* (Brady); Heron-Allen & Earland: 46, pl. 2, fig. 14.

DIAGNOSIS. A species of *Adercotryma* with only 3 chambers in the final whorl. In spiral/umbilical view, test oval-lobate, maximum diameter often almost twice the minimum diameter. In edge view, 3 chambers seen on apertural side, only 2 on antapertural side. Aperture single, interiomarginal, a bilobed narrow, elongate slit without rounded extremities at umbilical end of chamber.

NAME. In honour of Joseph Wright, in whose collection from Dublin Bay this species was first noticed.

HOLOTYPE. National Museum of Ireland (NMI) no. 149.1985. Illustrated in spiral, edge (apertural), umbilical and edge (antapertural) views in Figs 7A–D. Ex J. Wright Collection, slide 34.

TYPE LOCALITY. Off Drogheda, E Ireland, depth 16 fathoms (30 m).

DESCRIPTION (HOLOTYPE). Test free; a dextral, tightly coiled trochospire, with 3 chambers in the final whorl, gradually increasing in size; involute on spiral side. Test an inverted cone-like structure, truncated spirally, rounded-convex umbilically and broadly rounded peripherally. In edge view, 3 chambers seen on apertural side, 2 on antapertural side. In spiral/umbilical view, oval-lobate, maximum diameter almost twice the minimum diameter; umbilical side with very shallow and small axial depression. Adult chambers elongate in axial (edge) view, less elongate in tangential direction, narrow in radial direction; inflated equally both spirally and umbilically. Intercameral sutures well defined and slightly incurved laterally and umbilically, less well defined and straight spirally. Aperture single, interiomarginal, a bilobed narrow slit without rounded extremities, at umbilical end of chamber, symmetrical with respect to long chamber axis. Border of aperture rests on first and on penultimate chamber of final whorl (*Paratrochammina*-type). Wall agglutinated, imperforate, coarser on spiral side than on umbilical side. Colour of test, prior to coating for SEM photography, orange-brown.

DIMENSIONS (HOLOTYPE). Maximum spiral/umbilical diameter 240 μm, minimum diameter 150 μm, height 220 μm.

PARATYPES. Two paratypes are figured herein. NMI no. 4.1980 (Figs 7E, F) is a sinistral specimen; the aperture is perfectly preserved and shows the bilobed, narrow, elongate slit; the development of a central, triangular lip-like projection of the chamber wall serving to divide the aperture into two virtually identical parts. This specimen has a maximum spiral/umbilical diameter of 220 μm and test height of 240 μm. NMI no. 5.1980, the other illustrated paratype (Figs 7G–J), is dextrally coiled like the holotype. Its maximum spiral/umbilical diameter is 200 μm, the test height 210 μm.

The sectioned specimen (ZF 4453), from the Heron-Allen & Earland Collection, off W Scotland, has a maximum diameter of 220 μm and height of 180 μm; it is figured in Fig. 3B.

REMARKS. *Adercotryma wrighti* sp. nov. is easily distinguished from *A. glomeratum* (Brady) by the overall shape of the test, only 3 chambers in the final whorl, the shape of the adult chambers and the

bilobed apertural features formed by the triangular lip-like projection of the chamber wall. *A. glomeratum* always has 4 chambers in the final whorl and a test which in spiral/umbilical aspect has a maximum diameter little greater than the minimum.

Both Millett (1908) and Heron-Allen & Earland (1913) show specimens from W Ireland with only 3 chambers in the final whorl. We have examined their collections and many slides in the Brady and the Norman Collections (BMNH), labelled *Haplophragmium glomeratum* (Brady), from Scotland, Ireland and N England and all exclusively contain *A. wrighti* rather than *A. glomeratum*. Careful study of specimens previously recorded as *A. glomeratum* may extend the present range of *A. wrighti* beyond the British Isles.

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